EDITORIAL ARTICLES.

ROTTER ON PLASTIC OPERATIONS IN THE CAVITY OF THE MOUTH AND ON THE NOSE

Dr. Josef Rotter, of Munich, contributes to the *Munchener Med. Wochenschrift*, nost 30—32, 1889, an elaborate and fully illustrated article, in which he describes a series of extensive plastic operations done by him while serving as an assistant to Professor von Bergman in the University Clinic at Berlin. They were presumably done at the suggestion and with the supervision of his chief. They are new of their kind and deserving of attention to that degree that they are herewith transcribed quite fully for the study of the readers of the ANNALS OF SURGERY.

I. *Cicatricial Ankylosis of the Lower Jaw.*—Cicatricial closure of the jaws is, as a rule, caused in the following way: The mucous membrane of the cheek is destroyed, either through an ulcerative process, or a burn, and in the process of healing is replaced by cicatricial tissue. The latter has, as is well known, a strong tendency to shrink and retract, especially in case of the cheek, where through the deficiency of bony support, the soft parts easily yield to the traction. In the course of the process it retracts to half or one-third of the size of the original extent of the ulcerated surface, and finally as a rigid band unites the upper and lower jaw so tightly that the teeth cannot be separated. Besides, it possesses such a resistance, that methodical dilatation often furnishes only incomplete results, and even by employing great force under anæsthetics only little dilatation is possible.

The fate of such cases is, therefore a deplorable one. They can then be radically cured only, if after removal of inelastic cicatricial tissue, the wound of inner side of the cheek be covered by mucous membrane or epidermoidal skin. Then shrinkage is excluded. In case of great extent of the defect there is a deficiency of mucous membrane. The obtaining of epidermoidal tissue from the skin, and the technique of its implantation are difficult and explain why such operations have been hitherto so rarely performed.

Gussenbauer[1] made about ten years ago successful trials in this direction. He rotated the cheek in the true sense of the word, viz., he turned the outside inside, toward the cavity of the mouth, and the raw inner side outside, and covered the latter then by means of a piece of skin taken from the neck.

This complicated procedure has recently been supplanted by a much simpler one by Gersuny[2] and Hacker[3].

Gersuny, after extirpation of a carcinoma of the mucous membrane of the cheek, covered the defect immediately with a pediculated flap from the neck. He separated the cheek from the lower jaw and put the flap which was taken from the neck through this slit into the mouth so that the base of the flap rested upon the edge of the lower jaw beneath this slit, and the epidermis covered surface looked inward and the raw surface came into contact with the raw inside wall of the cheek where he fixed it by means of sutures. The result was a satisfactory one.

In uncomplicated procedures, this method is certainly to be recommended as a rational one. But if, scars are present beneath the lower jaw, which render the formation of a well-nourished and extensible flap impossible and if one intends to avoid new and disfiguring scars in those exposed parts of the face, especially in patients which are still growing then one must try to procure the material from a remote part of the body. In such a case Rotter took a flap from the upper arm.

The patient, æt. 6 years, through noma had lost the mucous membrane of the whole right cheek, the alveolar processes and also a part of the skin of the cheek, of the size of a half a dollar. The latter defect was corrected by means of a small operation with a flap, taken from the region of the lower jaw. The cicatrix left by the healing process on the inner side of the cheek led to such a high degree of closure of the jaw, that only liquid food could be taken; also upon the affected side the teeth of the upper jaw bored themselves into the gums of the lower jaw. Methodical dilatation having failed, the following operation was resorted to:

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[1] Gussenbauer, *Arch. f. klin. Chir.*, xxi. p. 256 and xxvi, p. 231.

[2] Gersuny, *Centrbl. f. Chir.*, 1887, S. 706.

[3] V. Hacker, *Zeitschr. f. Heilkunde* bd. ix.

At first the cheek and alveolar processes which had become broadly agglutinated, were separated with the knife, and in order to manipulate more freely behind, the cheek was split by a perpendicular cut at the anterior edge of the masseter muscle. Through the slit thus made. the finger could be introduced into the cavity of the mouth and one could stretch the skin,extending between the upper and lower jaw; and thus find every unyielding cicatrical band which then could be divided by the knife. After the cicatrical tissue had been extirpated the mouth could be opened nearly to the normal degree.

A pediculated flap of skin from a remote part of the body was essential to fill the defect and for this purpose the upper arm seemed to be most available. Accordingly the right arm was placed in the proper position, and fixed to the head by means of adhesive plaster, cotton and bandages—plaster of Paris cannot be used, as the dressing becomes too voluminous --a pediculated flap was formed from that part of the upper arm which was in closest proximity to the slit of the cheek, and put in through this slit into the cavity of the mouth, so that the epidermis-covered side of it was directed toward the teeth while its raw surface came to lie upon the raw inner surface of the cheek. For the purpose of facilitating the careful fixation of the flap in its new position, especially in the folds of the cheek, it was necessary to divide the cheek horizontally by an incision from the angle of the mouth outward to the primary perpendicular incision. After the fixation of the flap this horizontal incision was immediately closed by sutures. The arm had to remain in its fixed position upon the head, until the skin flap, which received its nutrition through the pedicle, connecting it with the upper arm, was so closely healed to and connected with the cheek, that it was sufficiently nourished by the latter. This requires according to the experience of others, seven to nine days. During this time the apparently uncomfortable position of the arm upon the head, was borne excellently.

On the seventh day after the operation one-half of the pedicle was severed and on the ninth day the other half; the vertical slit in the cheek was then closed by sutures. The flap had healed in its whole extent to the inner side of the cheek and its appearance was not changed in any way. The functional result was very satisfactory.

The patient could again separate the teeth to the width of one inch, and could satisfy her excellent appetite, so that she presented in a short time a blooming physique. About a year and a half after her dismissal from the clinic, information was received that the result was a lasting one, that she could open her mouth then just as wide as after the operation, and that the ingrafted skin-flap had remained unchanged.

II. *Covering of a Defect in the Hard Palate by Means of a Flap from the Forehead*.—Aside from the typical and frequently practiced urano-plasty according to the methods of von Langenbeck, in which the congenital fissure of the hard palate is closed by means of flaps consisting of mucous membrane and periosteum there are only two cases reported in the whole literature, in which defects of the palate have been closed by other procedures. Blasius tried in a patient, in whom the nose as well as the hard palate seem to have been destroyed, to heal into the defect in the palate a pediculated flap taken from the forehead, which he introduced in the cavity of the nose. The result, however, was negative, as the flap became gangrenous. Von Langenbeck does not approve of this method. He said, that this cutaneous flap, being stretched and exposed to a double current of air, therefore would certainly become dry and gangrenous before the heterogenously-organized wound edges could unite.

This method of Blasius was often tried on cadavers by Prof. von Nussbaum, pulling the flaps from the forehead through a slit, which he formed in the lateral wall of the nose, into the palate defect. He had never an opportunity to try it on the living subject.

The second case was operated upon by Thiersch in the year 1868, and was successful. He closed a hole in the hard palate which was caused by a shot, by means of a flap formed from the whole thickness of the cheek, the apex of which, reached down as far as the lower jaw and rested with its base in the region of the upper jaw. After chiseling away the superior alveolar maxillary process he carried the flap into the mouth and sutured it into the palate defect, where it healed in smoothly. The good result Thiersch principally ascribes to the circumstance, that the flap was formed from the whole thickness of the cheek, thus having upon both sides an epithelial covering, externally epidermis and internally mucous membrane, doing away with the danger of the tissues becoming dry.

To these two cases the author now adds a third, operated upon two years ago. Blasius' method was chosen and through certain modifications, which partially were made possible only by modern surgery and partially resulted from the peculiar circumstances connected with this case, a very satisfactory result was obtained. The patient, æt. 6 years, was afflicted with a congenital right sided total labio-palatal fissure of unusual width. The cleft palate was operated on according to the Langenbeck method; the united flaps, consisting of mucous membrane and periosteum, healed in their whole extent by first intention, but on the left side, between the edge of the flap and the teeth, there remained a defect about a half inch wide, through which the mouth and cavity of the nose communicated with each other. As the processus palatinus of the left upper jaw had not a horizontal position but as is found exceptionally in very broad cleft palates, it occupied a nearly vertical position, so that the cleft could not be closed entirely.

To remedy this defect it was decided to bring a flap from the forehead, with a long pedicle, and carry it through the still open labial fissure into the palatal defect.

A long tongue-like cutaneo periosteal flap was first formed from the forehead, and the defect in the forehead was at once closed by a simple shifting of the skin. The raw surface of this flap, viz., the periosteum which had been separated with it, was now covered with skin grafts according to Thiersch's method, and was secured upon the forehead for the time being. After eight days the skin grafts were healed to the flap. Now the operator possessed a skin flap which was covered on both sides with epidermis, and seemed to be freed from the danger of becoming dry in its future position. In order to make its pedicle sufficiently movable it was necessary to carry the right incision on the side of the nose as far as into the hare-lip and to separate the right half of the nose from the pyriform aperture. Then, by turning up the nose, the long flap could, with ease, be put throuph the labial fissure into the palatal defect in such a manner that the grafted surface was directed towards the nasal cavity, the natural epidermis side toward the oral cavity, and the apex of the flap came to lie in the posterior part of the defect. A few sutures sufficed for its fixation. After eight days this forehead flap had healed to the adjacent tissue in its new position. The pedicle of the flap was then cut through at a point on a level with the edges of the incisor teeth. The parts outside of the oral cavity and the nose were brought back into normal position; the defect caused in the face by the formation ot the flap could be entirely covered. Finally the hare-lip was repaired. The disfigurement in the face by cicatrices was slight.

The flap healed nicely to the palate and in spite of continued moistening by the saliva and exposure to the effects of chewing it has remained unchanged two years after the operation. The development of hair upon the same, as taken from the forehead, is minimal. The sensations of taste and pain are as good as normal.

III. *Rhinoplasty With a Skin—Periosteum—Bone Flap.*—Rhinoplasty performed for bony defects of the nose has had very doubtful results as flaps formed of soft parts were used.

The nose, generally exceedingly voluminous at first, soon shrinks away to normal proportions, thus satisfying the hopes of the patient, but as time goes on it dwindles down to a puffy and insignificant roll of skin. In order to do away as much as possible with the cicatricial retraction Thiersch[1] introduced bracing of the flap, a procedure furnishing better results, but it necessitated using much skin from the face. The ideal for which all strove could be seen in the efforts to form a new "bony frame-work." Langenbeck in seeking this took bone strips from the edges of the pyriform aperture and placed them upright against each other like rafters of a roof, over which he expanded the skin flap taken from the forehead. Unfortunately these pillars sank on account of the lack of support at the place of their union. The hope that the periosteum which was taken simultaneously with the flap from the forehead might produce bone and serve as a solid support has proven itself to be delusive. This long felt want in rhinoplasty has recently been filled by Koenig through the introduction of an exceedingly invaluable plastic material, the "skin-periosteum-bone-flaps" (=S.P.B.F.), which he used in the treatment of so-called "Sattelnasen," for the building up of a bony dorsum of the nose. The procedure of Koenig was used by the author in a somewhat modified manner with very good results in the following case:

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[1] Thiersch, ueber eine Modification der Rhinoplastik, Verhandlungen d. deutschen *Gesellsch f. Chirurgie*, viii, p. 67.

The patient, a female, æt. 17 years, as a consequence of an "ulcer" (probably hereditary syphilis) suffered from a sinking in of the dorsum of the nose when 8 years of age. In order to remove this deformity the tip of the nose, which through the sinking in of the dorsum nasi was turned upward, had to be drawn down again and a new and straight dorsum be formed.

For the formation of the latter the author took a skin-periosteum bone-flap from the middle of the forehead by circumcising with the knife, at once penetrating down to the bone, a rectangular skin-flap of about $^3/_4$ inch in breadth and 2 inches in length. Through this cut in the skin a $^1/_{16}$ inch deep furrow was made in the bone by means of a sculptor's gouge placed upon its edges. This furrow circumscribed the bone-flap, which was raised by a chisel put flat towards it and having the same breadth as the bone-flap, which was separated from the diploë, proceeding from above downward. The separated frontal flap consisted now of skin, periosteum and a $^1/_{16}$ inch thick bone plate, all connected with each other. Thereupon the little turned up nose was separated by an oval incision at the angle of the sinking in on a level with the pyriform aperture and drawn down into its normal position, whereby between it and the sunken in bony dorsum nasi a triangular defect was left. The latter was now bridged over with the frontal flap, which was arranged in such a manner that the fold of the pedicle was formed upon the uppermost part of the dorsum nasi, and the epidermis-covered side of the flap was directed towards the nasal cavity, having its bony side anteriorly. Its free end was pushed under the dorsum of the little pug nose and after freshening up it was fixed by sutures. The stiff transposed frontal flap now kept the little pug nose downward and the former was again kept in its new position by the latter. The firm framework of the nose was thus completed. The defects upon both sides of the nose still required attention. The lateral walls were to be directed upon their inner surfaces, towards the cavity of the nose, and also must have upon their outer surface a covering of epidermis. For the formation of the inner surface the inwardly placed epidermal surface of the original flap, which was broader than the bone plate, was available; for the formation of the outer surface the skin of the original dorsum nasi was used by splitting it in the median line, separating it from the subjacent tissue and rendering it so movable that it could be sutured to the raw surface of the primary flap and the raw edges of the pug nose. Finally only the bone plate which formed the new dorsum nasi was without epidermal covering, which was supplied by grafting after Thiersch's method.

The recovery took its natural course and the result was a very satisfactory one.

The great progress, which is included in Koenig's method for operation, lies in the employment of flaps containing bone, which render it possible to form a straight, narrow and sharply contoured dorsum nasi, and which also make the obtained good results lasting. Observation has shown that this dorsum, formed from this transplanted bone plate, is not absorbed, but that it persists in its original thickness and firmness after four or five years (so far as our experience reaches at the present).

For future cases the author recommends to form the upper skin flap broad enough to enable one to cover completely the oval defect of the nose, which results after the separation of the little pug nose. Then the new lateral walls of the nose will be covered with epidermis on their inner surface in their whole extent.

The good results obtained in the use of the S. P. B. flap in "Sattelnasen" suggested its employment also in *total* defect of the nose, for the formation of *entire noses*, and in two such cases the method was employed by the author.

The first patient, a woman, æt. 20 years, had lost the entire cartilaginous and the largest part of the bony nose through lupus. The membranous septum was absent, the skin of the right cheek was transformed, to a great extent, into cicatricial tissue, and the lower eyelid was turned outward.

The building of a new nose was begun by the formation of an inch and a half broad and two inches long S. P. B. flap from the forehead. The defect upon the latter could easily be covered by a simple displacement of the skin after having been denuded, and only a linear cicatrix remained in the median line of the forehead.

The flap so gained was, as in the first case, brought down in such a manner that the skin was directed toward the cavity of the nose, the raw surface presenting itself anteriorly.

From the frontal bone-plate, 1½x2 inches, a framework had to be formed for the nose. The violent manipulations necessitated by it, sawing, etc., would surely have caused a separation of the bone-plate from the freshly taken flap, as it (the bone-plate) was only loosely connected with the skin by the periosteum. The author waited, therefore, until the granulation process had taken place, which by the accompanying inflammatory processes, caused a solid and resistable attachment.

Four weeks later the bone-plate was divided into three longitudinal parts by means of a saw. The median part remained entirely in connection with the subjacent tissues and formed the new dorsum; both lateral parts were separated from the subjacent tissues down to the region of the new tip of the nose, where they were then turned around at a right angle so that they took the position of the alæ nasi and acted as supporting bony piers to the new dorsum nasi. They received their nutrition through the connection of their lower end (at the tip of the nose) with the skin of the flap. By this procedure a bony saw-horse-like nasal framework was formed. The dorsum rested above, upon the remains of the nasal bones, and below, upon the new bony alæ nasi. To cover this framework with skin was the next step. The surfaces directed toward the cavity of the nose were already clothed by the skin of the frontal flap.

For the external covering of the framework the author used the skin of the pyriform aperture, which was loosened by an oval incision and drawn down. Into the corners of the wound, which resulted on both sides through drawing down of this bridge of skin, viz., at the base of the latter, the bony alæ nasi were sutured. The skin itself was used as a kind of binding for the edge of the new large anterior naris.

Further, the lower portions of the lateral walls of the new nose were well covered with the skin of the old nasal dorsum, which, after incising in the median line and lateral separation, was made as movable as possible. There remained still the upper portions of the lateral walls and the dorsum nasi without epidermal covering. These portions were covered by Thiersch's transplantation method.

Finally, an entire nose was formed, which had a solid saw-horse like framework, consisting of bony beams, and having an epidermal covering on its external as well as internal surface. Recovery resulted without any complications.

A septum was lacking for the new nose. Partly for cosmetic reasons and partly to prevent a flattening of the nose, the patient was fitted up with an artificial nasal septum, which was prepared of epidermis-like colored hard rubber. It was half an inch high; the tip of the nose thus rose three-fourths of an inch above the surface of the upper lip.

In a *second case of total rhinoplasty* the author devised another procedure by which he thought to imitate much better the architecture of nature. Instead of a saw-horse like framework, he built up a solid bony septum, upon which he hung the lateral soft parts. The patient was a boy, æt. 11 years, who had lost the entire cartilaginous and a large part of the bony nose through hereditary syphilis. The membranous septum was preserved. The operation was begun by the formation of a somewhat triangular frontal S. P. B. flap, the base of which had a breadth of one and one-half inches. The raw surface, *i. e.*, the bone-plate, was immediately covered with skin according to the Thiersch method. Then the skin of the pyriform aperture was separated by a semi-circular incision and drawn down. Thereupon the frontal flap was brought down, after the incision bordering on its right side had been extended down into the pyriform aperture, and the pedicle was rendered sufficiently movable. Then by turning the pedicle around at a right angle upon its edge it was placed in the position of the former nasal septum, so that the epidermoidal side of the flap was directed toward the left, and the transplanted side toward the right side. The upper angle of the bone-plate rested upon the nasal bones and the perpendicular lamina of the ethmoid bone; the base of it in one half rested upon the floor of the nose, viz., upon the anterior part of the crista nasalis, where the mucous membrane, having been split in the median line, was somewhat separated laterally from the subjacent tissue and was sutured to the edge of the new septum, after its edges had been freshened. The other half of the base of the frontal flap reached above the level of the face, forming the prominence of the new nose and a bony septum.

In order to fix this in its new position, the piece of skin which was drawn down from the circumference of the pyriform aperture was drawn over the part of the new septum corresponding to the tip of the nose, and was thus brought into the position of the alæ nasi, and, after freshening its edges, was sutured at the place of contact. With the preserved membranous septum the prominent part of the base of the flap was bound around. Besides, the skin of the old dorsum nasi, after having been split in the median line and separated from the subjacent tissues, was sutured to the pedicle of the frontal flap, as in the former case.

By this step of the operation a bony septum, the alæ nasi and the upper part of the dorsum nasi were formed. Between the latter and the alæ nasi there still remained on both sides a triangular defect, by which the nasal cavity continued to be open. This defect was closed, in order to prevent disfigurement of the face through further scars, by means of a skin flap taken from the forearm, in a similar manner as in Case I. One week after the first step a flap was formed, having quite a long pedicle, and its raw surface immediately covered with epidermis, according to Thiersch's method. Eight days later, after adhesion had taken place, the left arm was bandaged to the head and the free end of the flap, now covered on both sides with epidermis, was sutured to the edges of the nasal defect on the right side (the wound edges being freshened), which was accomplished without any difficulty. After the lapse of seven days more, the position of the arm being well tolerated, the pedicle was severed, liberating thereby the arm. The free edge of the flap was now sewed to the edge of the left sided nasal defect. It healed in its whole extent. Finally the twisted pedicle of the primary frontal flap, forming a roll, was separated from the subjacent tissues somewhat below the eyebrow, thrown upward and used for the partial covering of the frontal defect. The remaining frontal defect, after denuding the skin and making two incisions to relieve tension in the region of the hair covered scalp, could be closed in a linear manner through simple displacement.

The result of this rhinoplasty was not as good as the author had expected. The nasal septum, consisting of bone and skin, was too voluminous for the size of the nose, later retention of secretions occurred, and a part of the bone-plate was expelled. Thereby the prominence of the nose was flattened. Besides, the skin-flap, which had been taken from the arm, shrunk considerably, became very thin and covered with an abundant supply of hair. Therefore in the future the author advises to use in covering the nose only skin taken from the forehead, without considering the scar caused thereby.

The first case of total rhinoplasty, at the end of two years, was examined again. The final result was most excellent. The bony framework of the nose had preserved itself well, and possessed such a solidity that even by a strong pressure of the fingers not the slightest dislocation or even yielding could be caused. The lateral bony laminæ, which took the position of the alæ nasi, have entirely grown together with the new dorsum nasi, which they support, as well as with the facial surface of the upper jaw upon which they rest. The dorsum nasi is entirely straight. The tip rises about three-fourths of an inch above the level of the upper lip. Respiration goes on freely, with a closed mouth.

The form of the whole nose is a much better one than in those in which the new nose is formed entirely from soft parts, even in their most advantageous stages. This is evidenced by the fact that the patient is now employed as a salesgirl in a silverware store in Berlin.

In the future, according to the views of the author, no rhinoplasty should be performed unless the "Skin-Periosteum-Bone-Flaps" are used; for only with these are we enabled to obtain results with which not only the operator, but also the patient, will be satisfied.

As a method for such operations, according to the excellent final result in the first patient, the author warmly recommends this procedure, which includes the formation of a saw-horse like bony framework.

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